

Evaluation of modified chitosan nanoparticles as sorbent for chromium(VI) ions from polluted water

Naifa S. Alatawi^a, Nadia H. Elsayed^{b,c}, W.S. Mohamed^{c,*}

^aPhysics Department, Faculty of Science, University of Tabuk, Tabuk 71421, Saudi Arabia, email: goood_28@hotmail.com

^bChemistry Department, Faculty of Science, University of Tabuk, Tabuk 71421, Saudi Arabia, email: nhelsayed@ut.edu.sa

^cDepartment of Polymers and Pigments, National Research Centre, Cairo 12311, Egypt, email: ws.mohamed@nrc.sci.eg (W.S. Mohamed)

Received 9 December 2017; Accepted 8 April 2018

ABSTRACT

Chitosan nanoparticles with particle size about 84 nm were successfully prepared in tripolyphosphate (TPP) solution and modified through redox grafting reaction of different amounts of amino ethyl methacrylate (AEMA) monomer producing chitosan-g-AEMA. Both of chitosan and its modified copolymer were characterized by Fourier-transform infrared, scanning electron microscopy and transmission electronic microscopy analyses. The prepared chitosan and chitosan-g-AEMA were used for adsorption of Cr(VI). The effect of pH values, adsorbent dose, contact time, temperature and Cr(VI) ion concentration was studied. The data show that the percentage of Cr(VI) removal using chitosan-g-AEMA is more than that of chitosan nanoparticles. The optimum conditions for adsorption of Cr(VI) were pH 3 and 120 min of contact time at room temperature using 2:1 chitosan:AEMA ratio. Adsorption process was confirmed by Langmuir's model.

Keywords: Chitosan nanoparticles; AEMA; Adsorption; Chromium

* Corresponding author.